C. ENTRANCE FACILITIES

Q. What types of entrance facilities does Verizon VA offer?

A. Verizon VA offers entrance facilities with the same transmission capabilities as interoffice dedicated transport facilities (DS3, STS-1, OC-3 and OC-12).

Q. What technical assumptions did Verizon VA make about entrance facilities for its cost studies?

A. The cost studies are premised on the use of Synchronous Optical Network (SONET) transport equipment. This equipment is the most efficient technology currently available for provisioning high capacity local access service. Because of the unique nature of this service and the type of customer it serves, the transport facilities are generally dedicated to point-to-point facilities and provided using different facilities from the more general local access infrastructure. There is minimal opportunity for network resource sharing other than the fact that the fiber strands supporting this service and supporting the local access services addressed in the loop construct are usually contained in the same large fiber feeder cable from the central office to the CLEC location.

Q. What charges does Verizon VA propose for entrance facilities?

A. Verizon VA proposes a fixed monthly charge to recover its forward-looking costs associated with providing entrance facilities.

Q. Please describe how Verizon VA developed the unbundled dedicated transport entrance facility costs.

A. As with the loop cost study, Verizon VA developed weighted manufacturers' material prices and determined the material price investments by service design at the system level by equipment type. Verizon VA used the same method described above to determine total installed unit investments and land and building investments.

Verizon VA then summed the equipment type investments by account and applied the annual cost factors to these investments by account to yield annual costs, which were then divided by 12 to arrive at a monthly cost. The costs were then summed by account to arrive at service level costs.

The workpapers for Unbundled Dedicated Transport – Entrance Facilities can be found in VZ-VA CS, Vol. VIII, Part D-1 of the cost study documentation.

VIII. SIGNALING SYSTEMS AND CALL-RELATED DATABASES (JDPL ISSUES II-1 to II-1-d; II-2-c-d; IV-30; IV-36)

A. ELEMENT DESCRIPTION

Q. What does this section of the testimony address?

A. This section addresses the basic methodology that Verizon VA used to calculate signaling and call-related database costs in its recurring cost studies. Verizon VA first describes the costing tools that were utilized, and then the methodology.

Q. Please describe the signaling system and call-related databases element.

A. The element is described in FCC Rule 47 C.F.R. § 51.319(e) as follows:

> *Signaling networks and call-related databases.* An incumbent LEC shall provide nondiscriminatory access, in accordance with § 51.311 and § 251(c)(3) of the Act, to signaling networks, call-related databases, and service management systems on an unbundled basis to any requesting telecommunications carrier for the provision of a telecommunications service.
>
> (1) Signaling networks. Signaling networks include, but are not limited to, signaling links and signaling transfer points.
>
> (i) When a requesting telecommunications carrier purchases unbundled switching capability from an incumbent LEC, the incumbent LEC shall provide access from that switch in the same manner in which it obtains such access itself.
>
> (ii) An incumbent LEC shall provide a requesting telecommunications carrier with its own switching facilities access to the incumbent LEC's signaling network for each of the requesting telecommunications carrier's switches. This connection shall be made in the same manner as an incumbent LEC connects one of

its own switches to a signaling transfer point.

(2) Call-related databases. Call-related databases are defined as databases, other than operations support systems, that are used in signaling networks for billing and collection, or the transmission, routing, or other provision of a telecommunications service.

(i) For purposes of switch query and database response through a signaling network, an incumbent LEC shall provide access to its call-related databases, including but not limited to, the Calling Name Database, 911 Database, E911 Database, Line Information Database, Toll Free Calling Database, Advanced Intelligent Network Databases, and downstream number portability databases by means of physical access at the signaling transfer point linked to the unbundled databases . . . .

(ii) Notwithstanding the incumbent LEC's general duty to unbundle call-related databases, an incumbent LEC shall not be required to unbundle the services created in the AIN platform and architecture that qualify for proprietary treatment.

(iii) An incumbent LEC shall allow a requesting telecommunications carrier that has purchased an incumbent LEC's local switching capability to use the incumbent LEC's service control point element in the same manner, and via the same signaling links, as the incumbent LEC itself.

(iv) An incumbent LEC shall allow a requesting telecommunications carrier that has deployed its own switch, and has linked that switch to an incumbent LEC's signaling system, to gain access to the incumbent LEC's service control point in a manner that allows the requesting carrier to provide any call-related database-supported services to customers served by the requesting telecommunications carrier's switch.

(v) An incumbent LEC shall provide a requesting

telecommunications carrier with access to call-related databases in a manner that complies with section 222 of the Act.

(3) Service management systems:

(i) A service management system is defined as a computer database or system not part of the public switched network that, among other things:

(A) Interconnects to the service control point and sends to that service control point the information and call processing instructions needed for a network switch to process and complete a telephone call; and

(B) Provides telecommunications carriers with the capability of entering and storing data regarding the processing and completing of a telephone call.

(ii) An incumbent LEC shall provide a requesting telecommunications carrier with the information necessary to enter correctly, or format for entry, the information relevant for input into the incumbent LEC's service management system.

(iii) An incumbent LEC shall provide a requesting telecommunications carrier the same access to design, create, test, and deploy Advanced Intelligent Network-based services at the service management system, through a service creation environment, that the incumbent LEC provides to itself.

(iv) An incumbent LEC shall provide a requesting telecommunications carrier access to service management systems in a manner that complies with § 222 of the Act.

Q. What is the scope of Verizon VA's studies presented here?

A. Verizon VA's studies are limited to the signaling network elements, including STP Port and Signaling links, and access to certain databases.

Q. Please define the signaling network elements used in Verizon VA's forward-looking incremental cost study.

A. Signaling information is switched at Signaling Transfer Points (STPs), and is carried between STPs and local and tandem switches over signaling links. Routing and other information used by the signaling network are stored in call-related databases known as Intelligent Service Control Points (ISCPs). The protocol used for signaling information is known as Signaling System 7 (SS7). A call-related database query is a switch query and database response through the signaling network, which provides access to Verizon VA's Line Information Database (LIDB) and Toll Free Calling (800) database by means of physical access at the STP. The Service Management System (SMS) gives a carrier the ability to create new Advanced Intelligent Network (AIN) services of its own design using Verizon VA's AIN network.

Q. Please provide an example illustrating how a call traverses through the signaling network.

A. To set up trunk connections and route calls between them, digital switches, local or tandem, must exchange information about the connection needed.

The process of exchanging this information is called trunk signaling. These signals are essentially data messages sent from the processor of one digital switch to the other. The messages alert the other switch that a connection is needed, describe the connection including routing information, and finally indicate when the connection should end. Signaling information can be exchanged over the same trunks that carry the actual telecommunications channel. This is called "in band" signaling and was the principal method used in telephone networks. But with processor-controlled switches, it is more economically efficient and more secure to exchange signaling information over a special purpose network. This is referred to as "out of band" signaling. The SS7 network is the data network that supports out of band, trunk signaling. A diagram of the SS7 network can be found in the Cost Manual.

B. STP PORT AND SIGNALING LINK

Q Please describe the forward-looking construct used to develop the costs associated with the STP port.

A. Representative STP models were determined by reviewing the actual STP network serving Virginia. A forward-looking representative STP for each actual STP was designed in Common Channel Signaling Cost Information

System ("CCSCIS") and used as the basis for determining the investments associated with the STP port.

Q. What cost methodology was used to develop the STP port element and signaling link element?

A. The cost methodology used in developing the STP port cost is consistent with the cost methodology for switching described earlier. Forward-looking material investments were converted to annual costs through the application of annual cost factors calculated by the VCost model described earlier.

Q. How were the material investments for the STP port developed?

A. The material investments for the STP were developed using Telcordia's. CCSCIS is the companion to the SCIS model used to develop costs associated with the local switching element, and it develops investments in the same manner as SCIS. Verizon VA applied the latest vendor discount to the material investment in CCSCIS.

Q. What version of CCSCIS was used for Verizon VA's study?

A. Verizon VA used the latest available version from Telcordia, Version 5.0.4.

Q. How was the investment for the Signaling Link developed?

A. The investment for the Signaling Link element was developed by taking the investments and the associated costs previously developed for the Dedicated Transport "fixed" and "mileage" elements at the DS0 level. These costs reflect the costs associated with the DS0 level facility that comprises the Signaling Link.

C. LIDB, 800, AND AIN DATABASE QUERY

Q. What forward-looking construct was used to develop the LIDB, 800, and AIN query costs?

A. A representative model Intelligent Signaling Control Point (ISCP) for each database (LIDB, 800, and AIN) was determined by reviewing the actual LIDB, 800, and AIN databases. A forward-looking representative ISCP for each database was designed, based on the actual ISCPs serving Virginia. The forward-looking model office was used as the basis for determining the investments associated with each database query. These databases are described in more detail in the Cost Manual.

Q. Please describe the cost methodology used in developing the LIDB, 800, and AIN query costs.

A. The cost methodology used in developing the LIDB, 800, and AIN query cost is consistent with the cost methodology described above. Forward-looking

material investments were converted to annual costs through the application of annual cost factors developed in the VCost model.

Q. How were the material investments for the queries developed?

A. The material investments for the queries were developed using CCSCIS. Verizon VA applied the latest vendor discount to the material investment in CCSCIS.

Q. How did Verizon VA develop the SS7 transport costs associated with the database queries?

A. All SS7 message investments were obtained from CCSCIS and reflect the investment in SS7 LINKS and STPs. The investments used in the study are a weighted average inclusive of all Virginia STPs and a weighted average of all A links, D links, and C links (up to the SCP for the particular service involved) for the entire state.

D. AIN SERVICE MANAGEMENT SYSTEM (AIN SERVICE CREATION COSTS)

Q. What AIN Service Creation cost studies are presented here?

A. Verizon VA has presented cost studies for AIN Service Creation Usage, Certification and Testing, Help Desk, Subscription Charge, Database Queries, Utilization Element, Service Modification, Switched

Announcement, and Service Creation Access Ports. A description of each of these elements can be found in the AIN Service Creation cost study, VZ-VA CS, Vol. VIII, Part F-4.

Q. Please describe the AIN service creation model underlying Verizon VA's cost study.

A. Verizon VA's study is based on the assumption that carriers will access the Service Creation Environment (SCE) through the same platform, ISCP SPACE™, that Verizon itself uses.

Q. Please describe the Advanced Intelligent Network (AIN).

A. AIN is a service platform that utilizes the SS7 signaling network. It consists of a database that can intelligently route calls or provide other intelligent functionalities. This database is known as an ISCP. The mechanism to query the ISCP is known as an AIN trigger and occurs in an end office. End offices that have the ability to trigger are called Service Switching Points (SSP).

Q. Please describe each of the components of AIN.

A. The following are brief descriptions of the components of AIN.

(1) **SSP** – This is an end office equipped with specific software and hardware that enables it to recognize that AIN processing is needed for a given call, utilizing an AIN trigger.

(2) **AIN Trigger** – This is the event (administered by the SSP) by which an SSP recognizes that AIN service processing is needed for a given call. A trigger takes place at certain points during call processing which are called Trigger Detection Points (TDPs). During an AIN call, the SSP encounters triggers at TDPs. When an SSP encounters a trigger, the SSP stops call processing and initiates a transaction by sending an AIN message to the AIN ISCP requesting call processing instructions.

(3) **AIN ISCP** – An AIN ISCP is the intelligent database that stores and processes AIN services.

(4) **AIN Message** – The AIN SS7 TCAP message is the "packet" of information the SSP sends to the ISCP requesting call processing information (query). The AIN message is also sent back to the SSP with appropriate call processing information (response).

(5) **AIN Transport** – AIN Transport is the transport of the AIN message (query and response) from an SSP to an ISCP and back over the SS7 network.

(6) **AIN Query** – The term "AIN Query" refers to the processing of the AIN query and response (message) by the ISCP. AIN Query will also be referred to as the AIN Message and can be thought of as the dip into the ISCP database to obtain the call processing information.

(7) **AIN Service** – An AIN Service is a service that is based in an ISCP, not the end office. An AIN Service can be created by Verizon VA or another carrier and may reside in a Verizon VA ISCP or a carrier's AIN database. A carrier may create and deploy an AIN Service in a Verizon VA ISCP utilizing AIN Service Creation.

(8) **AIN Service Creation** – AIN Service Creation gives a carrier the ability to create new AIN services of its own design using Verizon VA's AIN network.

(9) **AIN ISCP Record** – An AIN ISCP Record is the information (service logic) stored in the ISCP for each end user utilizing a specific AIN service.

Q. Please describe the cost methodology used to develop the cost components of AIN Service Creation.

A. A complete description of the cost methodology used to develop each cost component associated with AIN Service Creation is included in the AIN Service Creation cost study, VZ-VA CS, Vol. VIII, Part F-4.

IX. ELEMENT COMBINATIONS (JDPL ISSUES II-1 to II-1-d; II-2-c-d; IV-30; IV-36)

A. REGULATORY BACKGROUND

Q. Does Verizon VA provide elements in combined form?

A. Yes. Verizon VA provides UNE combinations for any elements that Verizon currently combines in its network, as required by 47 C.F.R. § 51.315. Examples of UNE combinations include the UNE-Platform and expanded extended loop.

Q. What is the UNE-Platform?

A. The UNE-Platform consists of all of the individual network elements used by Verizon VA to provide service to a particular subscriber. For example, the UNE-Platform might consist of local loop, switching, and transport elements for certain subscribers, but the UNE-Platform might include only local loop and switching elements for other subscribers.

Q. What is an EEL?

A. An EEL is a combination of a loop and interoffice transport facilities, together with multiplexing where required. In some cases, multiple loops are multiplexed for the interoffice transport portion of an EEL. Verizon VA provides the EEL UNE to CLECs only when it is already combined as special

access at a particular location, as explained more fully in Section II of Verizon VA's Unbundled Network Elements Panel Testimony.

B. RECURRING CHARGES FOR COMBINATIONS

Q. How does Verizon VA determine the recurring charge for an element combination?

A. As a general rule, the recurring charge for an element combination is simply the sum of the recurring charges for the constituent elements. Thus, the recurring charge for the UNE-Platform would equal the sum of the recurring charges for the elements used to serve that subscriber. The one exception to the general rule is for EELs. For EELs, an additional charge applies for testing in response to trouble reports, as discussed below.

C. THE EEL TESTING CHARGE

Q. Why is Verizon VA proposing an "EEL Testing Charge?"

A. The EEL Testing Charge is a recurring charge proposed by Verizon VA to recover the costs associated with testing EEL arrangements in response to trouble reports. If a customer served by an EEL arrangement reports a problem with service, resolving that problem requires determining whether the problem exists in the loop portion or the transport portion of the service (*i.e.*, "sectionalization"). This determination requires the use of testing

equipment in the serving central office for the loop. Because a CLEC purchasing an EEL does not have any equipment installed in the serving central office for the loop, the CLEC cannot perform such testing itself. Thus, Verizon VA must perform subscriber trouble testing for EEL arrangements, and it is appropriate for Verizon VA to recover the relevant costs associated with EEL testing.

Q. How was the testing charge determined?

A. An EEL Testing expense factor has been developed that, when applied to the investment in the underlying loop component of the EEL arrangement, produces the forward-looking costs associated with subscriber trouble testing for the loop component. These costs are divided by 12 and multiplied by common overhead and gross revenue loading factors in order to develop the monthly costs for testing.

Q. How was the EEL testing factor developed?

A. The forward-looking costs associated with subscriber trouble testing for the loop component of an EEL arrangement consist of the expenses associated with subscriber trouble testing and the investment-related costs of testing equipment. Verizon VA was able to obtain data concerning outside plant-related subscriber trouble reports and thereby translate the specific expenses

associated with subscriber trouble testing for outside plant facilities. However, because testing equipment is used for subscriber trouble testing as well as other purposes, it was necessary to develop a surrogate to allocate the portion of testing equipment costs associated with outside plant-related subscriber trouble testing.

To determine the appropriate portion of testing equipment-related costs that should be allocated to outside plant-related subscriber trouble testing, Verizon VA used the ratio of (1) subscriber trouble testing expenses for outside plant facilities to (2) all testing expenses. Thus, Verizon VA first identified the overall level of subscriber trouble testing expenses for outside plant facilities incurred by Verizon VA in 1999. This amount was adjusted to remove testing expenses associated with non-regulated portions of the network. After determining the ratio, the ratio was applied to the total investment-related costs for testing equipment (Verizon VA already identified these investments when calculating the Network ACF) to determine the level of investment-related costs attributable to outside plant-related subscriber trouble testing. These costs were then added to the outside plant-related subscriber trouble testing expenses and multiplied by common overhead and gross revenue loading factors to arrive at the total forward-looking estimate of outside plant-related subscriber trouble testing costs. Finally, this total, forward-looking cost estimate was used to develop a cost

factor that, when applied to the cost of an investment in an outside plant facility, calculates the appropriate share of Verizon VA's total monthly outside plant-related subscriber trouble testing costs attributable to that investment.

Q. Are subscriber trouble testing costs recovered through the loop UNE rates calculated in the loop cost study?

A. No. As explained in the discussion of the Network ACF in this testimony, Verizon's local loop studies exclude the costs associated with loop testing in response to subscriber trouble reports. The exclusion of these expenses from the local loop study reflects the assumption that, in the forward-looking environment, the CLEC purchasing a loop (but not an EEL) will perform the subscriber trouble testing function itself. Thus, it is necessary to develop an additional charge for such testing in connection with the purchase of unbundled EELs, for which the CLEC must rely on Verizon VA to perform such testing.

Q. Is the cost factor for EEL testing applied to the IOF element of the EEL?

A. No. Unlike the case with unbundled loops, Verizon VA ordinarily would be responsible for trouble testing on unbundled IOF facilities. Accordingly, the costs associated with trouble testing on IOF facilities were already included

in the Network ACF for those facilities and thus did not require application of an additional cost factor in connection with the EEL element.

X. MISCELLANEOUS SERVICES (JDPL ISSUES II-1 to II-1-d; II-2-c-d; IV-30; IV-36)

A. DAILY USAGE FILE

Q. Please explain the daily usage file (DUF) service.

A. This service provides resellers and UNE purchasers with the IntraLATA local and toll call usage record details of their end users. DUF consists of the processing and transmission of those call record details.

Q. How were the processing and transmission costs for DUF developed?

A. Costs were developed for Record Processing, Data Transmission, and Tape or Cartridge. The costs include the computer processing usage time, computer termination maintenance, salary and wages of personnel handling the data transmission functions, software maintenance and disk maintenance.

B. CUSTOMIZED ROUTING

Q. Please describe the Customized Routing of OS/DA for resale.

A. Customized Routing, as the term is used in this testimony, provides a reseller with the ability to route local OS/DA calls from a resold line to an Alternative Operator Service Provider (AOSP), *i.e.*, to an operator service provider other than Verizon VA.

Q. How will this service be provided in the future?

A. The long-term view for this service is to make use of Advanced Intelligent Network technology. Using an AIN switch "trigger," the Verizon switch providing the CLEC's end user dial-tone will launch a query to an SCP, which will provide instructions on how to route the call, which trunk group to select specific to the originating line, traffic type of the specific call and the destination of the call.

Q. What assumptions were made with respect to other elements or services that the reseller must provide?

A. Customized Routing of OS/DA for Resale requires the reseller to purchase direct trunks in order for the routed calls to be directed to the designated trunk group, and transported to the AOSP that will handle OS/DA for the reseller. These trunk facilities must either be purchased from Verizon VA, or otherwise provided for by the reseller.

Q. What costs are involved in this service?

A. There are two types of costs that are involved with this service: non-recurring establishment costs and SS7 costs (including AIN Transport and Query). The non-recurring costs are addressed elsewhere in the testimony.

Q. How were the recurring costs calculated in the study?

A. First, the average number of OS/DA calls per month for these calls for all lines were identified. Each one of these "re-routed" calls needs to launch an AIN query for routing instructions. The average number of OS/DA calls was multiplied by the cost for the AIN Query and AIN Transport to establish the SS7 costs per line per month.